

### **REMARKS**

Applicants are filing this Amendment and Response under 37 CFR §1.111 in response to the Examiner's rejection of Claims 1-58. The Examiner has rejected Claims 1, 4, 6-48 under 35 U.S.C. §112, second paragraph, Claims 2, 3, 5, 49-54 and 56 under 35 U.S.C. §102 (b) and Claims 1, 4, 8-10, 12-14, 17-19, 21, 55, 57 and 58 under 35 U.S.C. §103(a).

Applicants request the entry of this Amendment and Response for the reasons set forth below.

#### **Amendment to Claims**

Applicants have amended Claims 1, 13 and 22 to delete the language "or a reacting equivalent".

Applicants have also amended Claims 40 and 41 to delete the word "predominantly".

Applicants have amended Independent Claims 2, 49 and 51 to include the language "and having a sulfur of content less than 0.3 percent as measured by ASTM Test No. D 4951-92".

Applicants submit that the amendment claims will result in overcoming the Examiner's rejections as explained below.

### **The Rejections**

#### **Claim rejections under 35 U.S.C. §112**

Claims 1, 4, 6-48 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

#### **Claims 1, 13 and 22**

The Examiner states:

Claim 1 recites "reacting equivalent" in line 4 after the formula. The scope of the claim is confusing because it is not clear what is encompassed by this phrase. While it is noted that page 16, lines 18-19 of the present specification discloses that the "reacting equivalent" means any material equivalent to ethylene glycol and carbon dioxide such as carbonic acid half ester, the scope of the claim is still confusing because it is not clear what is meant by equivalent or when materials are considered to be equivalent to ethylene glycol and carbon dioxide.

Similar confusion arises in each of Claims 13 and 22 that each also recite "reacting equivalent".

Applicants' have deleted the term "reacting equivalent" rejected by the Examiner in Claims 1, 13 and 22. Applicants' amended Claims 1, 13 and 22 obviate the Examiner's rejection.

#### **Claim 20**

The Examiner states:

Claim 20 recites the limitation "the second promoter" in line 1. There is insufficient antecedent basis for this limitation in the claim. In the above phrase, it is suggested that the "the" is changed to "a".

Applicants have amended Claim 20 as recommended by the Examiner, thus obviating the Examiner's rejection to Claim 20.

**Claims 40 and 41**

The Examiner states:

Claims 40 and 41 each recite the phrase "predominantly straight-chain alkyl group". The scope of the claims is confusing because it is not clear what is meant by "predominantly" or what types of straight chain alkyl groups are to be "predominantly" straight chain.

Applicants' deletion of the word "predominantly" in Claims 40 and 41 obviate the Examiner rejection of amended Claims 40 and 41.

**Claim 42**

The Examiner states:

Claims 42 recites that the alkyl group of the alkylphenol is "attached predominantly" at the para position of the phenol ring. The scope of the claim is confusing because it is not clear what is meant by "attached predominantly". Clarification is requested.

The use of the phrase "attached predominantly" in Claim 42 denotes that the para attachment of the alkyl group to the aromatic ring predominates, i.e. is greater than the attachment of the alkyl group at the ortho-position or the meta-position on the aromatic ring. Dependent Claim 43 further limits this parameter by specifying that the alkyl group attachment to the para-position on the aromatic ring is from about 70 to about 95 weight percent of the total alkylphenol. Applicants have explained the use of the phrase "attached predominantly" as intended in Claim 42, but will provide further clarification should the Examiner request it.

**Claim rejections under 35 U.S.C. §102(b)**

**Claims 2, 3, 5 and 49-52**

Claims 2, 3, 5 and 49-52 are rejected under 35 U.S.C. §102(b) as being anticipated by Vaughan (US 4,218,328).

The Examiner states:

Vaughan discloses process for preparing overbased lubricating oil additives comprising a reaction mixture combining Mannich condensation product of alkyl phenol wherein the alkyl group contains 8-128 carbon atoms, Group II metal oxide or hydroxide, ethylene glycol, i.e. promoter, and carbon dioxide. The Mannich condensation product of alkyl phenol is prepared by reacting alkyl phenol, aldehyde, and nitrogen-containing compound which clearly includes amine as presently claimed. It is further disclosed that the ratio of carbon dioxide to calcium is 0.3-0.5 (column 2, line 53-column 3, line 5; column 3, line 18; column 4, lines 9-17, 30, 39-41, 44 and 45; and column 5, lines 19-26). Given that the number of carbon atoms in the alkyl group of the alkyl phenol overlaps the number used in the present invention, it is clear that the alkyl group inherently contains a sufficient number of carbon atoms to render oil-soluble the resulting product. Further, given that Vaughan prepares overbased compound as presently claimed, it is clear that the combining is inherently carried out for a time and temperature sufficient to form such product.

Although there is no disclosure that the product of the process of Vaughan is a "detergent-dispersant antioxidant additive" as required in present Claim 49, applicants attention is drawn to MPEP 2111.02 which states that "if the body of the claim fully and intrinsically sets forth all limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction". Further, MPEP 2111.02 states that the statements in the preamble reciting the purpose or intended use of the claimed invention must be evaluated to determine whether the purpose or intended use results in a structural difference between the claimed invention and the prior art. Only if such structural difference exists, does the recitation serve to limit the claim. If the prior art structure is capable of performing the intended use, then it meets the claim.

It is the Examiner's position that the preamble does not state any distinct definition of any of the claimed invention's limitations and further that the purpose or intended use, i.e. detergent-dispersant antioxidant additive, recited in the present claims does not result in a structural difference between the presently claimed invention and the prior product and further that the prior art structure which is additive identical to that set forth in the present claims is capable of performing the recited purpose or intended use.

Applicants have amended independent Claims 2, 49 and 51 to include the language "and having a sulfur content of less than 0.3 percent as measured by ASTM Test No. D 4951-92," thus, adding a further limitation to the scope of these claims. Support for this amendment may be found on page 6, lines 24-27 of the specification.

Applicants submit that Vaughan does not teach or disclose a process for preparing Group II metal carbonated, overbased Mannich condensation products having a sulfur content of less than 0.3 percent as measured by ASTM Test No. D 4951-92. Furthermore, Vaughan discloses that "it is preferred that the reaction takes place in the presence of a chalcogen compound. His examples of suitable chalcogen compounds include sulfur containing compounds such as carbon sulfide, carbon oxysulfide, and sulfur dioxide. See column 4, lines 37-44.

Thus, Applicants' amended independent Claims 2, 49 and 51 are not anticipated by Vaughan and consequently, the dependent claims are also not anticipated by Vaughan because Vaughan does not disclose low sulfur containing Group II metal carbonated, overbased Mannich condensation products as is claimed in Applicants' amended Claims 2, 3, 5, 49-52.

**Claims 2, 3 and 5**

Claims 2, 3 and 5 are rejected under 35 U.S.C. §102(b) as being anticipated by Nichols et al. (US 5,173,203).

The Examiner states:

Nichols et al. disclose magnesium containing overbased product obtained by process comprising forming a reaction mixture by combining Mannich condensation product of alkyl phenol formed by reacting alkyl phenol, aldehyde and amine wherein the alkyl group of the alkyl phenol contains at least 30 carbon atoms, magnesium oxide, ethylene glycol, water, and carbon dioxide. The reaction takes place at 110-170 °C for 5 minutes to 2 hours (column 2, lines 60-68, column 7, lines 57-63, column 8, lines 59-67, column 9, lines 9-18 and 56-63, column 11, lines 3 and 60-68, and column 13, lines 25-30). Given that the number of carbon atoms in the alkyl group of the alkyl phenol overlaps the number used in the present invention, it is clear that the alkyl group inherently contains a sufficient number of carbon atoms to render oil-soluble the resulting product. Further, given that Nichols et al. disclose reacting the above for the time and temperature identical to that utilized in the present invention, it is clear that such reaction would inherently result in product comprising Group II metal carbonated, overbased Mannich condensation product of alkyl phenol as presently claimed.

In light of the above, it is clear that Nichols et al. anticipate the present claims.

Applicants have amended independent Claim 2 to include the language "and having a sulfur content of less than 0.3 percent as measured by ASTM Test No. D 4951-92," thus, adding a further limitation to the scope of these claims. Support for this amendment may be found on page 6, lines 24-27 of the specification.

Applicants submit that Nichols et al. do not teach or disclose a process for preparing Group II metal carbonated, overbased Mannich condensation products having a sulfur content of less than 0.3 percent as measured by ASTM Test No. D 4951-92. Nichols et al. disclose a magnesium containing overbasing process and product obtained therefrom. Their disclosed process for overbasing a substrate comprises mixing the substrate, water, phenol, a source of magnesium and a carbonating agent, wherein the water is retained

throughout the overbasing reaction. See column 2, lines 61-65. Their substrate includes, phosphorus acids, carboxylic acids and sulfur acids, which are oil-soluble per se, particularly oil-soluble sulfonic acids. See column 3, lines 31-34. There is no disclosure in Nichols et al. for a process for making carbonated, overbased Mannich condensation products. Mannich condensation products of alkyl phenol are only mentioned in Nichols et al. as additional additives for a fully formulated oil containing the overbased product of their invention. See column 11, lines 60-68 and column 13, lines 24-29. There is no disclosure or teaching in Nichols et al. that the Mannich condensation products used as additional additives for a fully formulated oil are overbased, let alone a disclosure or teaching of overbasing them.

In addition, Nichols et al. do not disclose or teach that the Mannich condensation products used as additional additives for a fully formulated oil contain less than 0.3 percent sulfur as in Applicant's amended Claim 2, and therefore, in Applicants' amended Claims 3 and 5.

Based on the above it is clear that Applicant's amended Claims 2, 3 and 5 are not anticipated by Nichols et al.

**Claims 53, 54 and 56**

Claims 53, 54 and 56 are rejected under 35 U.S.C. §102(b) as being anticipated by Farnig et al. (US 5,207,939).

The Examiner states:

Farnig et al. disclose Mannich reaction product of C<sub>1</sub>-C<sub>60</sub> alkyl phenol, n-phenyl-p-phenylenediamine, and aldehyde (column 1, lines 53-59, column 2, line 38 and column 3, line 13).

Applicants' cancellation of Claims 53, 54 and 56 obviate the Examiner's rejection of these claims.

**Claim rejections under 35 U.S.C. §103**

Applicants submit that all the claims were commonly owned at the time a later invention was made.

**Claims 55, 57 and 58**

Claims 55, 57 and 58 are rejected under 35 U.S.C. §103(a) as being unpatentable over Farnig et al. (U.S. 5,207,939).

The Examiner states:

Farnig et al. disclose Mannich reaction product of a C<sub>1</sub>-C<sub>60</sub> alkyl phenol, n-phenyl-p-phenylenediamine, and aldehyde (column 1, lines 53-59, column 2, line 20, column 2, line 38 and column 3, line 13).

While Farnig et al. fail to exemplify the presently claimed Mannich reaction product, nor can the claimed Mannich reaction product be "clearly envisaged" from Farnig et al. as required to meet the standard of anticipation (cf. MPEP 2131.03), nevertheless, in light of the overlap between the claimed Mannich reaction product and the Mannich reaction product disclosed by Farnig et al., absent a showing of criticality for the presently claimed Mannich reaction product, it is urged that it would have been within the bounds of routine experimentation, as well as the skill of level of one of ordinary skill in the art, to use Mannich reaction product which is both disclosed by Farnig et al. and encompassed within the scope of the present claims and thereby arrive at the claimed invention.

Applicants have cancelled Claims 55, 57 and 58, thus, obviating the Examiner's rejection.

**Claims 1, 4, 8-10, 12-14, 17-19 and 21**

Claims 1, 4, 8-10, 12-14, 17-19 and 21 are rejected under 35 U.S.C. §103(a) as being unpatentable over Smrcka et al. (U.S. 5,370,805) in view of Wollenberg (U.S. 4,803,002).

The Examiner states:

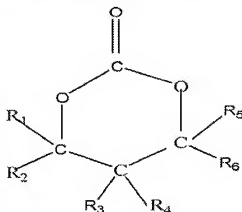
Smrcka et al. disclose process for making calcium Mannich alkylphenate which comprises forming a reaction mixture by combining (i) Mannich condensation product of alkyl phenol formed by reacting alkyl phenol,



paraformaldehyde, and amine, (ii) lime, i.e. calcium oxide, and (iii) ethylene glycol, i.e. promoter. Once the reaction is complete, volatiles are removed to leave the reaction product (column 4, line 61, column 5, lines 6 and 55-68).

The difference between Smrcka et al. and the present claimed invention is the requirement in the claims of the alkylene carbonate.

Wollenberg discloses reacting alkylene carbonate of the formula:



where  $R_1$ - $R_6$  are each independently selected from hydrogen or lower alkyl of 1 to 2 carbon atoms and wherein the alkylene carbonate includes ethylene carbonate with Mannich base such as that prepared by reacting alkyl phenol, formaldehyde, and amine in order to improve dispersant performance. Further, Wollenberg discloses reacting the alkylene carbonate with the Mannich base at temperature of 0-250°C for four hours which overlaps the time and temperature utilized in the present invention (column 1, lines 36-42 and line 68, column 2, line 4, and 40-56, column 3, lines 18-28, column 5, lines 9-20 and example 7. Given that the combination of Smrcka et al. with Wollenberg discloses process as presently claimed, including reacting Mannich base with alkylene carbonate for time and temperature that overlaps that utilized in the present invention, it is clear that carbon dioxide and alkylene glycol would inherently form in situ to inherently form Group II metal carbonated overbased Mannich condensation product of alkyl phenol as presently claimed.

In light of the motivation for reacting alkylene carbonate with Mannich base disclosed by Wollenberg as presently claimed, it therefore would have been obvious to one of ordinary skill in the art to react alkylene carbonate with the product of Smrcka et al. in order to produce Group II metal carbonated, overbased Mannich condensation product of alkyl phenol that has improved dispersant performance, and thereby arrive at the claimed invention.

The Examiner has failed to appreciate the difference in the use of alkylene carbonate in the present Claim 1 and the use in Wollenberg. In Claim 1 the use of alkylene carbonate is for carbonating and overbasing the Mannich condensation product of an alkyl phenol, while in Wollenberg the alkylene carbonate was used to functionalize the nitrogen on the Mannich base to make a carbamate. See column 6, lines 56-59; column 8, lines 13-44. A carbamate is not a carbonated, overbased Mannich condensation product of an alkyl phenol. The reaction of the alkylene carbonate with the Mannich condensation product of an alkyl phenol in Claim 1 does not result in the formation of a bond between the amino group on the Mannich condensation product of an alkyl phenol and a carbonyl carbon as in a carbamate. Instead, it is believed the product is as depicted on page 18, lines 19-24 of the present specification. What Wollenberg teaches is post-treatment of Mannich bases with alkylene carbonate. No where does Wollenberg disclose or teach carbonation and overbasing of Mannich condensation product of an alkyl phenol.

Furthermore, the carbonation in the present process is in conjunction with the overbasing reaction, i.e. the presence of a hydroxide or alkoxide during this reaction is required because the Group II metal is incorporated in the product. The Wollenberg process does not require the presence of a hydroxide or alkoxide because the Wollenberg process is not an overbasing process, i.e. the Group II metal is not incorporated in the product. The primary reason for using the alkylene carbonate in the present process in Claim 1 is carbonation and overbasing to increase the alkalinity reserve of the Mannich condensation product of an alkyl phenol by incorporation of Group II metal. Wollenberg does not disclose or teach this. Thus, a person of ordinary skill in the art would not look to Wollenberg for carbonation and overbasing Mannich condensation products of an alkyl phenol.

The similarity in time and temperature utilized in Wollenberg and the present process is irrelevant since the chemical reaction is completely different in the two processes.

In summary, Applicants submit that Claims 1, 4, 8-10, 12-14, 17-19 and 21 are not unpatentable over Smrcka et al. (U.S. 5,370,805) in view of Wollenberg (U.S. 4,803,002).

For the foregoing reasons, it is submitted that Applicants' Claims 1-52 are neither anticipated nor obvious. Accordingly, allowance of Claims 1-52 is respectfully requested.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "S. Kelley", is written over a horizontal line.

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Enclosure

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